

TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
1902A1

In Re Application Of: William H. Retsch, Jr. et al.



Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/737,283	December 16, 2003	Ann Lucrecia Woodward	24959	1711	6569

Invention: POLYMER ADDITIVES FOR POWDER COATINGS

COMMISSIONER FOR PATENTS:

Transmitted herewith is the Appeal Brief in this application, with respect to the Notice of Appeal filed on:

April 26, 2006

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Diane R. Meyers
Registration No. 38,968
Attorney for Applicants

Dated: February 28, 2007

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February 28, 2007

(Date)

Beth M. Stiffler

Signature of Person Mailing Correspondence

Beth M. Stiffler

Typed or Printed Name of Person Mailing Correspondence

CC:



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: : PATENT APPLICATION
WILLIAM H. RETSCH, JR. et al. :
Serial No. 10/737,283 : Group Art Unit: 1711
Filed: December 16, 2003 : Examiner: Ana Lucrecia Woodward
For: POLYMER ADDITIVES FOR : Attorney Docket No. 1902A1
POWDER COATINGS :

APPEAL BRIEF

MAIL STOP: Petition
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

Appellants hereby appeal the final rejection of the captioned case as set forth in the Office Action mailed February 3, 2006.

REAL PARTY IN INTEREST

PPG Industries Ohio, Inc., Ohio is the real party in interest, as evidenced by the assignment filed at Reel 014824/Frame 0821.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

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on <u>February 28, 2007</u>	Date
 Signature	
Beth M. Stiffler Typed or Printed Name of Person Signing Certificate	

STATUS OF CLAIMS

Claims 1-60 are pending in the application. Claims 1, 4, 5, 8, 9, 11-15, 26, 31, 32, 35, 36, 38-42 and 59 are rejected and appealed. Claims 2, 3, 6, 7, 10, 16-25, 27-30, 33, 34, 37, 43-58 and 60 are withdrawn from consideration.

STATUS OF AMENDMENTS

No amendments were filed in response to the Final Office Action.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is directed to a compound that comprises the reaction product of a highly branched polymer having terminal functional groups and a lactone, wherein the highly branched polymer is the step-growth polymerization reaction product of a polyfunctional first monomer having a first functional group and a polyfunctional second monomer having a second functional group wherein the first and second functional groups will react with each other but not themselves (Page 2, lines 9-14); the polymer is not a polyester (Page 22, lines 8-9).

The present invention is further directed to a curable powder coating composition comprising (a) a compound that comprises the reaction product of a highly branched polymer having terminal functional groups and a lactone; wherein the highly branched polymer is the step-growth polymerization reaction product of a polyfunctional first monomer having a first functional group and a polyfunctional second monomer having a second functional group wherein the first and second functional groups will react with each other but not themselves; and (b) a crosslinker (Page 13, lines 7-9).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1, 8, 9, 11-15, 26, 35, 36, 38-42 and 59 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Magnusson et al. (U.S. Patent No. 6,617,418).
2. Claims 26, 35, 36, 38-42 and 59 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Barsotti et al. (U.S. Patent Publication No. 2004/0043152A1).

3. Claims 1, 4, 5, 8, 9, 11-15, 26, 31, 32, 35, 36, 38-42 and 59 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Bruchmann et al. (U.S. Patent No. 6,376,637) in combination with Jansen (U.S. Patent No. 5,788,989).

ARGUMENT

Rejection of Claims 1, 8, 9, 11-15, 26, 35, 36, 38-42 and 59

Claims 1, 8, 9, 11-15, 26, 35, 36, 38-42 and 59 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Magnusson et al. This rejection is respectfully traversed.

Magnusson is cited as allegedly teaching the reaction mixture of at least one oxetane and optionally another monomer or polymer; this reaction mixture can be further "processed", such as by chain extension with a lactone. The hyperbranched polyether of Magnusson, however, is apparently prepared by performing a ring opening of oxetane. In contrast, the present hyperbranched polymer is prepared by step-growth polymerization. One skilled in the art will appreciate that the structure resulting from a ring-opening polymerization and the structure resulting from a step-growth polymerization will be significantly different. Moreover, Magnusson does not appear to appreciate any significance to the use of lactone. In contrast, Appellants have determined that it is the reaction of the highly branched polymer with a lactone that gives the structure the desired properties. Accordingly, it is submitted that the presently claimed structures are neither taught nor suggested by Magnusson.

In the Final Office Action, the Examiner maintains that the ring opened oxetane can be mixed with additional reactive comonomers to obtain hyperbranched polyethers having one or more other monomeric or polymeric units. The Examiner maintains "that it would have been obvious to one having ordinary skill in the art to have employed a hyperbranched polyether that is obtained from a (condensation polymerizable) reaction mixture comprising the ring-opened oxetane with additional reactive comonomer(s) in place of the hyperbranched polyether that is reacted with caprolactone per example 2." (See Final Office Action, page 3) It is submitted that, even taking into consideration the condensation polymerization referred to by the Examiner, the present compositions are still structurally different and not obvious

variants of the teachings of Magnusson. Moreover, it is highly unlikely that Magnusson's compositions, with the substitutions referred to, would be useful in a powder coating; similarly, it is not obvious that the performance of the hyperbranched polyethers taught by Magnusson would be similar to those of the present compositions. Polycaprolactones are anionic ring opening polymerizations, whereas the ring opening polymerizations of oxetane are cationic. (See Magnusson, Abstract)

Rejection of Claims 26, 35, 36, 38-42 and 59

Claims 26, 35, 36, 38-42 and 59 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Barsotti et al. This rejection is respectfully traversed.

The Barsotti reference appears to be limited to use of their reaction product in liquid coatings. One skilled in the art will appreciate that the formulation and components that are effective and useable in a liquid coating can vary significantly from those appropriate for a powder coating. Moreover, the processing and handling of powder coatings differs significantly from that of liquid coatings. Accordingly, the teachings relevant to a liquid coating composition do not render obvious a powder coating composition and vice versa.

In the Final Office Action, the Examiner argues that it is reasonably maintained that it would have been obvious to one skilled in the art, and within that person's ability, to have formulated a powder coating composition based upon the teachings of the Barsotti reference. Such a conclusion, first of, is without basis. There is no teaching or suggestions whatsoever in the Barsotti reference as to the desirability of making a powder coating, nor is there any motivation for doing so. Second of all, the conclusion reached by the Examiner greatly over simplifies coatings technology. Powder coatings, because of the way they are typically made, have significant process hurdles that liquid coatings do not. For example, powder coatings are typically made by blending all or most of the coating ingredients, including the resin and curing agent that ultimately crosslink to form the cured coating. This dry blend is subjected to a heated extrusion. During the heated extrusion, the powder coating components become heated and somewhat melted. This "melt mix" is ultimately extruded and pulverized into powder coating particles.

During the extrusion heat is generated. Heat, however, is what causes crosslinking between the coating components (namely the resin and curing agent). If the coating components crosslink during extrusion, they will not crosslink and cure to form the final coating. Significant process parameters need to be in place when making a powder coating, therefore, to ensure an adequate melt mixing, but to prevent a significant crosslinking of the coating components. To take components of a liquid coating, which may or may not be suitable or appropriate for a powder coating, and apply them to a powder coating composition, is therefore not as simple as the Examiner suggests.

Rejection of Claims 1, 4, 5, 8, 9, 11-15, 26, 31, 32, 35, 36, 38-42 and 59

Claims 1, 4, 5, 8, 9, 11-15, 26, 31, 32, 35, 36, 38-42 and 59 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Bruchmann et al. in combination with Jansen et al. This rejection is respectfully traversed.

Bruchmann is cited as allegedly teaching dendritic or highly branched polyurethanes that are chain extended with alkylene; Jansen is cited as allegedly teaching the equivalence of alkylene oxides and lactones as reactants. Thus, the Examiner concludes, it would have been obvious to use lactones as the chain extender in Bruchmann. Appellants respectfully submit that there is no teaching or motivation in either of the references to combine the teachings in the manner suggested in the Office Action. It is well established that for a combination of references to be properly applied, the combination must suggest an improvement along the lines of the invention to one skilled in the art. (See, for example, *In re Sernaker*, 217 U.S.P.Q.1 (Fed. Cir. 1983)) Here, Appellants cannot discern any suggestion whatsoever that the combination relied on by the Examiner would result in the presently claimed compounds. Even if there was motivation to combine the teachings, which Appellants do not concede, it would not result in the present invention. Jansen discloses a laundry list of items that are described as being "suitable reactants" to modify dendrimers. Significantly, there is no teaching or suggestion that everything in this list would react with a dendrimer to give compounds that would all be equivalent. In other words, everything in the list provided by Jansen may react with a dendrimer, but the result of each of these

provided by Jansen may react with a dendrimer, but the result of each of these reactions may give compounds that are significantly different in terms of chemistry and performance. Nothing in the either of the references suggest the desirability of forming the reaction product of a highly branched polymer and a lactone, or the use of such a product in a powder coating. Absent such teaching, Appellants respectfully submit that at best this is an "obvious to try" argument, which has been firmly rejected by the courts. (See, for example, *In re Geiger*, 815 F.2d 686, 688; 2 U.S.P.Q.2d, 1276, 1278 (Fed. Cir. 1987))

The Examiner indicates in the Final Action that the rejection is maintained "because lactones and alkylene oxides are suitable alternative reactants for further modifying the terminal groups of dendrimers . . ." (See Final Office Action, page 4) Appellants respectfully query, suitable for what? It is respectfully submitted that alkylene oxides are not suitable alternative reactants for the compounds claimed in the present case. Compositions prepared using the alkylene oxides of Jansen would not have the impact resistance of the compounds of the present invention. The two reactants are not interchangeable. Accordingly, it is respectfully submitted that the obviousness rejection should not be maintained.

The Examiner also states in the Final Office Action that as an alternative it would have been obvious to have used the polyurethane dendrimer as taught by Bruchmann and the composition of Jansen et al. and further react it with a lactone because Bruchmann states that "all dendrimers can be used in the invention". That Bruchmann states all dendrimers can be used in his own invention, does not provide the requisite motivation for using the polyurethane dendrimer of Bruchmann in the compositions of Jansen.

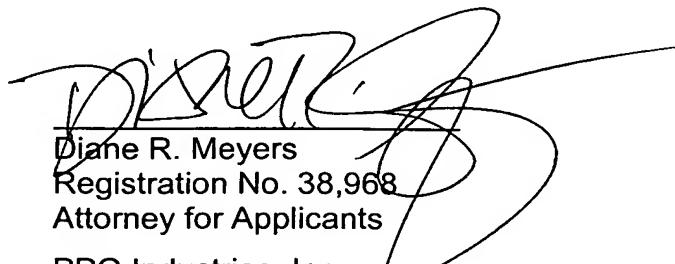
For all of these reasons, it is respectfully submitted that the Examiner has not met the burden of *prima facie* obviousness in the rejection of Bruchmann in conjunction with Jansen.

SUMMARY

It is respectfully submitted that all of the art of record is either directed to compositions that are structurally different than that claimed, or is directed to liquid rather than powder compositions. It is further submitted that the present invention is

not obvious in light of any of the art of record. Accordingly, Appellants respectfully request that the case be remanded to the Examiner for a Notice of Allowance.

Respectfully submitted,



Diane R. Meyers
Registration No. 38,968
Attorney for Applicants

PPG Industries, Inc.
One PPG Place
Pittsburgh, Pennsylvania 15272
Phone: (412) 434-2931

Pittsburgh Pennsylvania

CLAIMS APPENDIX

1. (Original) A compound that comprises the reaction product of a highly branched polymer having terminal functional groups and a lactone, wherein the highly branched polymer is the step-growth polymerization reaction product of a polyfunctional first monomer having a first functional group and a polyfunctional second monomer having a second functional group wherein the first and second functional groups will react with each other but not themselves, and wherein the polymer is not a polyester.
2. (Withdrawn) The compound of Claim 1, wherein the first monomer comprises at least one amine and the second monomer comprises at least one carboxylic acid.
3. (Withdrawn) The compound of Claim 2, wherein the amine comprises ethylene diamine and the carboxylic acid comprises trimellitic anhydride.
4. (Original) The compound of Claim 1, wherein the first monomer comprises at least one isocyanate and the second monomer comprises at least one alcohol.
5. (Original) The compound of Claim 4, wherein the isocyanate comprises isophorone diisocyanate and the alcohol comprises trimethylol propane.
6. (Withdrawn) The compound of Claim 1, wherein the first monomer comprises at least one isocyanate and the second monomer comprises at least one amine.
7. (Withdrawn) The compound of Claim 6, wherein the isocyanate comprises the isocyanurate of isophorone diisocyanate and the amine comprises ethylene diamine.

8. (Original) The compound of Claim 1, wherein the highly branched polymer has a number average molecular weight of 500 to 10,000.

9. (Original) The compound of Claim 1, wherein the terminal functional group is a hydroxy group.

10. (Withdrawn) The compound of Claim 1, wherein the terminal functional group is an amine.

11. (Original) The compound of Claim 1, wherein 1 to 100 percent of the terminal functional groups have a lactone grafted thereto.

12. (Original) The compound of Claim 11, wherein greater than 90 percent of the terminal functional groups have a lactone grafted thereto.

13. (Original) The compound of Claim 1, wherein the reaction product of the highly branched polymer and the lactone has a weight average molecular weight of 5,000 to 500,000.

14. (Original) The compound of Claim 1, wherein the lactone comprises epsilon-caprolactone.

15. (Original) The compound of Claim 1, wherein the reaction product of the highly branched polymer and the lactone comprises lactone chains comprising 1 to 50 lactone derived units.

16. (Withdrawn) A compound that comprises the reaction product of a highly branched polymer having terminal amine functional groups and a lactam, wherein the highly branched polymer is the step-growth polymerization reaction product of a polyfunctional first monomer having a first functional group and a polyfunctional second monomer having a second functional group wherein the first and second functional groups will react with each other but not themselves.

17. (Withdrawn) The compound of Claim 16, wherein the first monomer comprises at least one amine and the second monomer comprises at least one carboxylic acid.

18. (Withdrawn) The compound of Claim 17, wherein the amine comprises ethylene diamine and the carboxylic acid comprises trimellitic anhydride.

19. (Withdrawn) The compound of Claim 16, wherein the first monomer comprises at least one isocyanate and the second monomer comprises at least one amine.

20. (Withdrawn) The compound of Claim 19, wherein the isocyanate comprises the isocyanurate of isophorone diisocyanate and the amine comprises ethylene diamine.

21. (Withdrawn) The compound of Claim 16, wherein the highly branched polymer has a number average molecular weight of 500 to 10,000.

22. (Withdrawn) The compound of Claim 16, wherein 1 to 100 percent of the terminal functional groups have a lactam grafted thereto.

23. (Withdrawn) The compound of Claim 16, wherein greater than 90 percent of the terminal functional groups have a lactam grafted thereto.

24. (Withdrawn) The compound of Claim 16, wherein the reaction product of the highly branched polymer and the lactam has a weight average molecular weight of 5,000 to 500,000.

25. (Withdrawn) The compound of Claim 17, wherein the lactam comprises epsilon-caprolactam.

26. (Original) A curable powder coating composition comprising:

- (a) a compound that comprises the reaction product of a highly branched polymer having terminal functional groups and a lactone, wherein the highly branched polymer is the step-growth polymerization reaction product of a polyfunctional first monomer having a first functional group and a polyfunctional second monomer having a second functional group wherein the first and second functional groups will react with each other but not themselves; and
- (b) a crosslinker.

27. (Withdrawn) The curable powder coating composition of Claim 26, wherein the first monomer is at least one alcohol and the second monomer is at least one carboxylic acid.

28. (Withdrawn) The curable powder coating composition of Claim 27, wherein the alcohol comprises trimethylol propane and the carboxylic acid comprises adipic acid.

29 (Withdrawn) The compound of Claim 26, wherein the first monomer comprises at least one amine and the second monomer comprises at least one carboxylic acid.

30 (Withdrawn) The compound of Claim 29, wherein the amine comprises ethylene diamine and the carboxylic acid comprises trimellitic anhydride.

31. (Original) The compound of Claim 26, wherein the first monomer comprises at least one isocyanate and the second monomer comprises at least one alcohol.

32. (Original) The compound of Claim 31, wherein the isocyanate comprises isophorone diisocyanate and the alcohol comprises trimethylol propane.

33. (Withdrawn) The compound of Claim 26, wherein the first monomer comprises at least one isocyanate and the second monomer comprises at least one amine.

34. (Withdrawn) The compound of Claim 33, wherein the isocyanate comprises the isocyanurate of isophorone diisocyanate and the amine comprises ethylene diamine.

35. (Original) The compound of Claim 26, wherein the highly branched polymer has a number average molecular weight of 500 to 10,000.

36. (Original) The compound of Claim 26, wherein the terminal functional group is a hydroxy group.

37. (Withdrawn) The compound of Claim 26, wherein the terminal functional group is an amine.

38. (Original) The compound of Claim 26, wherein 1 to 100 percent of the terminal functional groups have a lactone grafted thereto.

39. (Original) The compound of Claim 38, wherein greater than 90 percent of the terminal functional groups have a lactone grafted thereto.

40. (Original) The compound of Claim 26, wherein the reaction product of the highly branched polymer and the lactone has a weight average molecular weight of 5,000 to 500,000.

41. (Original) The compound of Claim 26, wherein the lactone comprises epsilon-caprolactone.

42. (Original) The compound of Claim 26, wherein the reaction product of the highly branched polymer and the lactone comprises lactone chains comprising 1 to 50 lactone derived units.

43. (Withdrawn) The curable powder coating composition of Claim 26, further comprising a film forming resin.

44. (Withdrawn) The curable powder coating composition of Claim 43, wherein the film forming resin is hydroxy functional.

45. (Withdrawn) The curable powder coating composition of Claim 43, wherein the film forming resin is present in an amount of 50 weight percent or greater, based on total weight of the composition.

46. (Withdrawn) A curable powder coating composition comprising:

(a) the reaction product of a highly branched polymer having terminal amine functional groups and a lactam, wherein the highly branched polymer is the step-growth polymerization reaction product of a polyfunctional first monomer having a first functional group and a polyfunctional second monomer having a second functional group wherein the first and second functional groups will react with each other but not themselves; and

(b) a crosslinker.

47. (Withdrawn) The compound of Claim 46, wherein the first monomer comprises at least one amine and the second monomer comprises at least one carboxylic acid.

48. (Withdrawn) The compound of Claim 47, wherein the amine comprises ethylene diamine and the carboxylic acid comprises trimellitic anhydride.

49. (Withdrawn) The compound of Claim 46, wherein the first monomer comprises at least one isocyanate and the second monomer comprises at least one amine.

50. (Withdrawn) The compound of Claim 49, wherein the isocyanate comprises the isocyanurate of isophorone diisocyanate and the amine comprises ethylene diamine.

51. (Withdrawn) The compound of Claim 46, wherein the highly branched polymer has a number average molecular weight of 500 to 10,000.

52. (Withdrawn) The compound of Claim 46, wherein 1 to 100 percent of the terminal functional groups have a lactam grafted thereto.

53. (Withdrawn) The compound of Claim 46, wherein greater than 90 percent of the terminal functional groups have a lactam grafted thereto.

54. (Withdrawn) The compound of Claim 46, wherein the reaction product of the highly branched polymer and the lactam has a weight average molecular weight of 5,000 to 500,000.

55. (Withdrawn) The compound of Claim 47, wherein the lactam comprises epsilon-caprolactam.

56. (Withdrawn) The curable powder coating composition of Claim 26, further comprising a film forming resin.

57. (Withdrawn) The curable powder coating composition of Claim 43, wherein the film forming resin is hydroxy functional.

58. (Withdrawn) The curable powder coating composition of Claim 43, wherein the film forming resin is present in an amount of 50 weight percent or greater, based on total weight of the composition.

59. (Original) The curable powder coating composition of Claim 26, wherein said coating composition does not contain moieties curable by UV radiation.

60. (Withdrawn) The curable powder coating composition of Claim 46, wherein said coating composition does not contain moieties curable by UV radiation.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None